Space Weather Forecast

Issued on Wednesday, 08 February 2023 at 13:22 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Further Moderate flares likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with five Moderate flares observed, the largest of which was from a moderately complex sunspot region in the north centre disc. A further large region is present just to the south of this spot this is a magnetically simpler east-west aligned region and has remained stable. There are a total of six numbered sunspots, and three further new regions rotating onto it. A coronal mass ejection (CME) was produced by a common class-flare from the complex sunspot previously mentioned, just after midday on the 7th. However this has been assessed as likely passing over the Earth's orbit on the 11th. No other Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: Solar winds are generally elevated at 500-600 km/s with Earth in the fast wind originating from a couple of coronal holes. The magnetic field remained Weak to briefly Moderate, and whilst the north-south component was variable, it was more generally southward pointed. Geomagnetic activity was Quiet to Active (Kp 2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles is at Background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with a slight chance of High levels being reached, mainly owing to the developing sunspots in the northern hemisphere, as well as further regions expected to rotate onto the disc during the period.

Solar Wind / Geomagnetic Activity: CMEs which left the Sun on the 4th, 5th and 7th, while forecast to miss the Earth, give a low chance of glancing interactions between days 1-4 (8th-11th). Otherwise, ongoing elevated solar winds due to the recent coronal hole sourced enhancements, are forecast to gradually ease. Mainly Quiet to Unsettled geomagnetic activity is expected with a chance of Active intervals. There is a very slight chance of G1/Minor storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to remain at background, but there is a slight chance of this increasing towards the S1/Minor radiation storm level in response to any significant flares that occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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